

"I'll do it When the Snow Melts": The Effects of Deadlines and Delayed Outcomes on Rule-Governed Behavior in Preschool Children

Cassandra Braam

New Medico Rehabilitation Center of Wisconsin

AND

Richard W. Malott

Western Michigan University

This study examined the control exerted by different types of rules on the behavior of preschool children. Four similar rules were presented to eight, four-year-old children, using a multielement design. The contingencies the rules described varied in the specification of deadlines and in the delays in the delivery of the reinforcers. The results showed (a) rules specifying only response requirements did not reliably control behavior, (b) rules specifying an immediate deadline with the immediate delivery of a reinforcer exerted reliable control, (c) rules specifying an immediate deadline with a one-week delay in the delivery of the reinforcer also exerted reliable control, and (d) rules specifying no deadline with a one-week delay in the delivery of the reinforcer exerted little control. These results suggest that a rule's specification of a deadline is crucial in its control of behavior, but the delay of the reinforcer is of little importance. This latter conclusion further suggests that problems in self-control do not result from delayed outcomes or the inability to delay gratification, contrary to conventional wisdom.

Casual observation suggests that rules seem to control behavior to varying degrees, depending on the types of contingencies those rules describe. For example, the behavior of most adults is effectively controlled by this rule, "File your income tax by April 15 to avoid later financial penalties." Yet, their behavior is usually less effectively controlled by this rule, "Watch what you eat daily, to avoid later weight gain." Little, if any, empirical research addresses these relationships between rule control

and the types of contingencies those rules describe.

Before addressing this problem further, it may help to discuss some relevant terminology. A rule is a verbal description of a behavioral contingency (Skinner, 1953, 1969). Rules describe two general classes of contingencies (Malott, 1989)—contingencies that are direct-acting and those that are not direct-acting. Direct-acting contingencies involve outcomes that function as effective behavioral consequences for the causal response class. That is, the outcomes are sufficiently immediate, probable, and sizeable to punish or reinforce the causal response. An example of a rule describing such a contingency is, "If you touch that wire, you'll get shocked." The natural outcome of getting shocked for not following the rule usually suffices as an effective outcome for complying with such a rule.

Contingencies that are not direct-acting involve outcomes that do not function as

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effective behavioral consequences for the causal response class because they are too delayed, too improbable, or too small and of cumulative significance. An example of a rule describing such a contingency is, "If you exercise everyday for four weeks, you will lose one pound." The outcome (weight loss) for each day's exercise is too small (though of cumulative significance) to reinforce that instance of exercise.

We might also distinguish between complete and incomplete rules. Complete rules describe all components of a contingency including the occasion, the response, the outcome, and any deadline. Incomplete rules (often in the form of requests or mands) omit one or more components in their description of the contingency, generally the outcomes. The behavioral history of the listener, however, may still allow for effective control by the incomplete rule.

Rule-governed behavior is, simply, behavior under the control of a rule (the verbal description of a contingency). It is contrasted with behavior controlled directly by the contingency described by the rule (contingency-shaped behavior). Certain types of rules are effective in controlling behavior to the extent that (a) they specify responses in the person's repertoire, (b) they specify effective consequences, and (c) behavioral prerequisites for control by rules have been established (see Malott, 1984, 1989 for a discussion of these prerequisites).

An analysis of rule-governed behavior is not complete without specifying the critical components of the rules. One analysis of adult rule-governed behavior and self-management suggests that stated deadlines are important (Malott, 1986). For example, in self-paced college courses based on Keller's system of personalized instruction (Keller, 1968), the general rule often is, "You can take the tests for the course whenever you want." Many students, however, procrastinate until the end of the semester before taking the tests (Welsh, Malott, & Kent, 1980). In other words, rules without deadlines control test-taking less effectively than the rules in

an instructor-paced course in which frequent deadlines are usually specified.

As previously suggested, behavioral contingencies involving delayed outcomes do not punish or reinforce the response. However, rules describing deadlines and delayed consequences can control behavior. For example, the behavior of most adults would be controlled by this rule: "Send in this form plus the UPC symbol by September 30, 1991 to get a \$50 refund."

Few researcher have examined these features of rule control, especially with preschool-age children. They have focused instead on "instructional control" and "self-control." Most of these studies, however, do not deal with the sort of contingencies addressed by the current study.

One relevant study by Baer and Sherman (1964) used instructions and social reinforcement to develop generalized imitation. The instruction, "Can you do this?", was followed by a puppet modelling the response to be imitated. This study demonstrated, among other things, that the behavior of four-year-olds can be reliably controlled by an adult modelling gross motor responses, while stating incomplete rules, in this case mands specifying responses and implying social consequences. We have found no research with preschool children that has demonstrated generalized control by other types of rules such as those using the autoclitic frame (Skinner, 1957, p. 361) "If you (specifying a response) then (specifying a consequence)."

Several studies with college students have focused on the effects of externally imposed deadlines on intrinsic interest in a task (Amabile, DeJong, & Lepper, 1976; Deci, 1972) and on the use of frequent deadlines to decrease procrastination (Welsh et al., 1980). However, we have found no research specifically addressing the issue of deadlines in rule control with preschool children

The present research is based on the following analysis: A rule describing a contingency that is not direct acting governs behavior if the rule specifies a sizeable and probable outcome, regardless of the delay

between the causal response and that outcome. The specification of a deadline can be crucial in the control of such rules (e.g., "pay your taxes by April 15, or you'll also have to pay a penalty"). The statement of the rule governs such behavior, to the extent that the rule functions as an establishing operation that establishes noncompliance as an aversive condition which compliance attenuates. The aversiveness of noncompliance increases as the deadline approaches; but without a deadline, this noncompliance often fails to become sufficiently aversive that its termination will reinforce compliant behavior. (For more details of this analysis, see Malott, 1984, 1986, 1988, 1989).

More specifically the research presented in this paper was a beginning effort to systematically determine the control various types of rules exert over the behavior of four-year-old children. Specifically, this research investigated the control exerted by (a) rules describing no deadlines and implying social consequences (requests), (b) rules describing immediate deadlines with the immediate delivery of reinforcers (direct-acting contingencies), (c) rules describing no deadlines with one-week delays in the delivery of reinforcers (contingencies that are not direct-acting), and (d) rules describing immediate deadlines with one-week delays in the delivery of reinforcers (contingencies that are not direct-acting).

METHOD

Subjects and Setting

The subjects were students in two different classes at St. Mark's, a co-op preschool for normal children in Grand Rapids, Michigan. The eight children (four boys and four girls) were from two-parent, middle-income families. They ranged in age from three-and-a-half to four years. They were chosen to participate in the study based on their completion of tasks requested by the teacher. Five children (S1, S2, S3, S5, S6) completed a high percentage of clean-up tasks requested by the teacher. One child (S4) completed few of the tasks

the teacher requested. Two children (S7, S8) self-recruited, that is, asked to join the study. The experimenter conducted the study in four classrooms of the school, during a thirty minute free-play period at the beginning of each school day. The children participated in the study on the two days of the week they normally attended school. In the later no deadline conditions of the study, however, all the children did not participate in the study at the same time.

Materials

The experimenter used a "Magic Box" containing a variety of potential reinforcers (e.g., stickers, stampers, tops, magnets, balloons, skin decals, crayons, small toy dinosaurs, and small toy cars).

The experimenter used a variety of toys normally scattered around the classrooms during the pick up task, e.g., 20-30 small toys such as cars or blocks were put in a bucket. Later four toys requiring assembly were used because toys could not be left on the floor overnight. The toys were (a) wooden puzzles by Fisher-Price; (b) a plastic 3D puzzle by Combi; (c) a toy called "Button-Ups" by Fisher-Price, consisting of foam pieces and plastic buttons to attach the pieces together; and (d) a set of small colored pegs and pegboards. These toys seemed of equal difficulty and each required between five and thirty minutes to assemble. The toys also provided the opportunity for replication across tasks.

Design

A variation of a within-subjects, multi-element design was used (the rule and task conditions constituted the various elements). Trials consisted of the experimenter stating rules differing in the specified deadlines, delivery times of reinforcers, and tasks.

General Procedure

The experimenter approached a child already at play and stated a rule. To control for potential social consequences from other adults and children, she stated the rules when only a child participating in the study was present. Other children were

asked to leave the immediate area or the participant was taken aside. Adults were instructed to limit interactions with the children when they were participating in the study. After stating the rule(s), the experimenter did not interact with the child and ignored attempts to interact. She observed and recorded the child's responses to the rules, at a distance of at least 10 feet.

Requests. During the request condition the experimenter stated incomplete rule (requests). She specified picking up toys, but did not specify a reinforcer or deadline. For example, she said, "Nicole, would you pick up these toys?" She then followed the general procedure. She did not provide feedback or reinforcers during this condition. Subsequent requests to pick up new toys were made five minutes after the original set of toys were picked up. For picking up the original set of toys, she made subsequent requests after five minutes had elapsed without the toys being picked up. The experimenter presented one to three request trials to each child per session.

Deadlines. During the condition using deadlines with immediate reinforcers the experimenter stated complete rules describing an immediate deadline and a reinforcer for picking up toys. She also described a randomly alternating S-Delta condition where the deadline was stated, but the children were told there would be no reinforcer. This multiple schedule was used to determine whether the childrens' behavior was under the control of the rule's descriptions of the contingencies or the generalized demand characteristics of the environment and the experimenter. The active component of the schedule was determined by a random numbers table for each child on session-to-session basis. Different children were in different conditions (i.e., reinforcer versus no reinforcer) on the same day. However, only one condition was in effect per day for a given child, consisting of one to two trials.

By the age of four, most children probably have a long behavioral history of reinforcement for following and a history of punishment for not following requests.

Requests might exert considerable generalized control over children, due to the social consequences implied. Therefore, the phrase, "I don't care if you pick them up or not," was introduced. This was done to control for the potential effects of implied social consequences overshadowing the delivery of reinforcers specified in the rules. The phrase was added even though the experimenter was not, in fact, using social reinforcement or punishment.

During the reinforcer condition the experimenter stated a rule specifying an immediate deadline, picking up toys, and the immediate delivery of a reinforcer. For example, she said, "Here are some toys to pick up. I don't care if you pick them up or not. Here's the rule: If you pick up the toys now, you can go to the Magic Box when you're finished."

During the no reinforcer condition the experimenter stated a rule specifying an immediate deadline, picking up toys, but no delivery of a reinforcer. For example she said, "Here are some toys to pick up. I don't care if you pick them up or not. Here's the rule: If you pick up the toys now, you won't go to the Magic Box when you are finished."

The experimenter provided neutral performance feedback and a reinforcer immediately after a child picked up the toys in the reinforcer condition. For example, she said, "John, you followed the rule about picking up the toys right away, now you can go to the Magic Box." The experimenter provided neutral feedback, but no reinforcer, if a child did not start to pick up the toys within five minutes after the rule was stated. For example, she said, "Lee, you didn't follow the rule about picking up the toys right away, now you can't go to the Magic Box." She also provided feedback, but no reinforcer, after the child picked up or did not pick up the toys during the no reinforcer condition. For example, she said, "Nicole, you picked up (or didn't pick up) the toys right away, remember you can't go to the Magic Box today." Five minutes after she gave feedback, the experimenter presented either the reinforcer or no reinforcer rule, depending

on the random order of presentation selected prior to the session.

No deadlines with delayed reinforcers. During the condition using no deadlines with delayed reinforcers the experimenter stated complete rules describing no deadline, an assembly task, and a one-week delay in the delivery of the reinforcer. (Note, however, that this does not necessarily involve delayed reinforcement even though the contingency does involve the delayed delivery of a reinforcer. No experimental data demonstrate that the delivery of a reinforcer one week after the causal response will reinforce that causal response class.) The experimenter said, "Here's a puzzle you can do. I don't care if you do it or not. Here's the rule: Whenever you do the puzzle is fine; one week after you finish, you can go to the Magic Box." She stated the rule once at the beginning of a session to each child currently participating in the study. The child was allowed to leave a task and return to it at any time during a session. If the child began a task, but did not complete it during a session, the experimenter presented the same rule at the beginning of the next session. The child then started the task where he or she had stopped during the previous session.

One week following completion the experimenter delivered feedback and a reinforcer. She said, "John, remember you followed the rule and finished the puzzle last week, now you can go to the Magic Box." Before the one-week delay was over, the experimenter did not initiate contact with the child and ignored any attempts by the children to evoke social consequences for completing the tasks. The experimenter could again present a rule in the session following the feedback and reinforcer session. If a child did not start a task for three consecutive sessions (one and one half weeks), the experimenter recorded a non-completion. She then specified one of the other three assembly tasks (randomly selected) in the next rule. Although, this was clearly a three-session deadline, it was not stated to the children. The three-session deadline was used so the experi-

menter could assess the effects of a different assembly task to the child.

During interspersed trials, the experimenter also stated rules specifying an immediate deadline and the immediate delivery of a reinforcer, to children not completing tasks for six consecutive sessions (three weeks). This was done to assess if the children's failure to complete the assembly tasks was due to the difficulty of the tasks or to the weaker control of rules describing no deadlines with delayed reinforcers.

Deadlines with delayed reinforcers. During the condition using deadlines with delayed reinforcers, the experimenter stated complete rules describing an immediate deadline, an assembly task, and a one-week delay in the delivery of the reinforcer. For example, the experimenter said, "Here's a puzzle you can do. I don't care if you do it or not. Here's the rule: If you do the puzzle, now, one week after you finish the puzzle, you can go to the Magic Box." Performance feedback and a reinforcer, when appropriate, were provided one week after a child finished a task. For example, the experimenter said, "Lee, last week you followed the rule about doing the puzzle right away. So today you can go to the Magic Box." If the child did not complete the task, the experimenter presented neutral feedback, but no reinforcer, one week later. As previously, the experimenter did not initiate contact with a child before the one-week delay.

Data Collection and Interobserver Agreement

For all conditions of the study, the first author was the main observer. Following statements of incomplete rules (requests) and complete rules describing deadlines (with both immediate and delayed reinforcers), she scored a completion if a child started a task within five minutes and completed it by the end of the session. When no deadline was stated, the experimenter used the following scoring criteria: (a) a "completion" for a session in which a task was completed, (b) a "break" when a child left a task before completion, (c) a "working" if a child spent any time during a ses-

sion working on a task, and (d) a “noncompletion” for a task not completed within three consecutive sessions.

Reliability observers did not receive special training. They were those parent-aides (mothers) present on days when reliability observations were scheduled. (Mothers of the children in the study were not selected.) Prior to an observation, the experimenter asked a mother to observe a child and gave her a sample data sheet. She asked her to write down any of the child’s responses after the experimenter left the child. The experimenter also asked her to record the time that a child started a task and the time she returned the data sheet.

A total of sixteen (25%) reliability sessions were conducted, one or more during each condition. In addition, a person trained on the scoring code independently scored the raw data from the experimenter and observers.

There were relatively few responses observed per reliability session and for each rule presented (average of 6-8), therefore, the responses for each condition per condition were averaged. Interobserver agreement was calculated by dividing the sum of observer agreements about occurrence (or nonoccurrence) plus the number of disagreements about occurrence (or nonoccurrence) by the sum of observer agreements plus the number of disagreements about occurrence (or nonoccurrence) multiplied by 100. The mean agreements for the occurrence and nonoccurrence of a completion were 95-100% for all conditions.

RESULTS AND DISCUSSION

Requests

The request condition served as a comparison, baseline condition. Incomplete rules (requests or mands) specifying the response, but no deadline or outcome, did not reliably control the behavior of most of the children. As a group, they completed only 40% of the tasks (see Figure 1). However, the individual performance var-

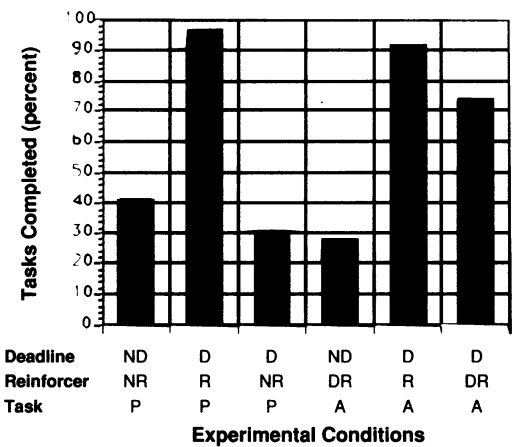


Fig. 1. Group mean performances during all conditions. (ND=no deadline; NR=no reinforcer; DR=delayed reinforcer; P=Pick-up toys; A=Assembly).

ied between total compliance (S6) and non-compliance (S1, S5).

Deadlines With Immediate Reinforcers

Complete rules describing deadlines with immediate reinforcers (direct-acting-contingencies) reliably controlled the behavior of all the children. They completed 97% of the tasks (see Table 1). However, during the interspersed comparison S-Delta trials, rules specifying imme-

Table 1
Mean % of performance across all conditions.

Experimental Conditions	Subjects								
	Task	S1	S2	S3	S4	S5	S6	S7	S8 Group
Requests: No deadline + no reinforcer	P	14 (1/7)	38 (3/8)	6 (6/9)	21 (5/14)	17 (1/6)	100 (4/4)		42 (20/48)
Deadline+ immediate reinforcer	P	100 (7/7)	100 (5/5)	100 (6/6)	100 (6/6)	75 (3/4)	100 (1/1)		97 (28/29)
Deadline + no reinforcer	P	38 (3/8)	44 (4/9)	0 (0/4)	0 (0/2)	38 (3/8)	0 (0/1)		31 (10/32)
No deadline + delayed reinforcer	A	86 (6/7)	0 (0/5)	0 (0/5)	50 (2/4)	0 (0/5)	17 (1/6)		28 (9/32)
Deadline + immediate reinforcer	A		100 (3/3)	67 (2/3)		100 (3/3)	100 (1/1)	100 (1/1)	92 (11/12)
Deadline + delayed reinforcer	A		80 (4/5)	33 (1/3)	100 (3/3)	100 (3/3)	50 (1/2)	50 (2/4)	74 (3/3)(17/23)

P=Pickup and A=Assemble.
Note: The data in parentheses are (tasks completed / total tasks).

diate deadlines and no reinforcers did not reliably control the children's behavior. The children completed only 31% of the tasks, during these interspersed comparison trials. The large difference in control by these S^D and S-Delta rules was consistent throughout the study.

Thus, we have two comparison conditions where no reinforcer was specified in the rule—the initial request condition (where no deadline or reinforcer was mentioned) and the S-Delta condition (where a deadline and the lack of a reinforcer was explicitly mentioned). In both conditions the rules failed to reliably control the children's behavior. So the reliable control by the rule describing both the immediate reinforcer for compliance and the deadline would seem to result from the specification of the reinforcer and not the deadline by itself nor the general demand characteristics of the setting nor generalized control by rules regardless of the contingencies they describe.

One potentially confounding variable was the feedback given five minutes after a rule was stated. (It should be noted that feedback was not given during the request condition and during the other two conditions feedback was not given until one week after a task was completed.) As other researchers have observed, feedback can acquire a discriminative stimulus control function. However, to maximally demonstrate such an effect feedback must be given immediately before the next opportunity to respond. Thus, when the experimenter told the children that they had (or had not) followed the rule and could (or could not) go to the Magic Box, this might have prompted the children to comply with the rule that had been stated five minutes before or to comply with the next rule presented. However, as the data show, the experimenter presented feedback about not doing a task on only two out of forty-one trials. Also, the experimenter gave feedback and the reinforcer (or only feedback), then she went to work with another child. Therefore, the next opportunity to respond was usually delayed in time from the feedback. Given this delay, it seems

less likely that the high percentage of compliance, with rules describing immediate deadlines with immediate reinforcers, was due to the feedback.

The two alternating rules (the S^D and S-Delta rules) almost immediately exerted differential control. The children differentially responded (58 out of 61 trials) to the two rules, starting on the first trial (S3, S4, S6) or after very few trials (S2, S5). In other words, the children either immediately completed the tasks after an S^D rule, or else immediately walked away or refused to do a task (e.g., saying, "No") after an S-Delta rule. This suggests control by the rule statement rather than control by the direct-acting contingency of reinforcement described by the S^D rule, because those actual reinforcing contingencies did not have sufficient opportunity to reinforce compliance. This further suggests that generalized control by classes of rules describing direct-acting contingencies might have been established prior to the study. Stated another way, this seems to be a clear case of rule-governed behavior rather than what is called "contingency-shaped" behavior.

No Deadlines With Delayed Reinforcers

Thus far the children had demonstrated that rules describing direct-acting contingencies controlled their behavior better than rules describing no contingencies. Now the question was whether rules describing contingencies that were not direct-acting also controlled behavior. So next we selected a contingency that our theory of rule-governed behavior suggested would exert poor control—a rule describing a contingency with no deadline. Our theory suggests that the delay in the outcome would have little detrimental effect on the control the rule exerts; nonetheless, we used a delayed rather than an immediate reinforcer, just in case that delay might further decrease the likelihood of rule control.

Rules describing no deadlines and one-week delays of the reinforcers (indirect-acting contingencies) did not reliably control the behavior of most of the children. The

Table 2
Work Patterns in No Deadline Condition.

Work patterns	Subjects					
	S1	S2	S3	S4	S5	S6
Total	7	5	5	4	5	6
Tasks completed	6	0	0	2	0	1
Tasks worked on but not completed	1	1	4	1	1	1
No work (days)	0	4	1	1	4	4
Tasks completed after a single rule presentation	6	0	0	1	0	1

children completed about the same number of tasks as when the experimenter presented rules describing no reinforcers (see Figure 1). The range of behaviors observed was narrow (see Table 2).

On the few occasions the children complied with the rules, they immediately started and completed the tasks; they did not take breaks and return later to complete a task. In addition, even though the opportunity was presented, they did not procrastinate by starting and finishing a task at later time. Only three children (S1, S4, S6) completed one or more tasks during the condition. These same three children, also, completed at least one task on the first day the experimenter presented this rule. It is interesting to note that S4 was chosen for the study based on a low percentage of compliance with teacher requests. Yet, he complied with 50% of the rules describing no deadline with delayed reinforcers and 100% of the rules describing deadlines with delayed reinforcers. Each of the six children worked on a task at least one time during the condition, but failed to complete it, usually by walking away. One child (S1), however, typically started and finished a task within one session, without taking breaks. Another child (S3), on the other hand, typically started a task, walked away, and only returned to the task the next time the experimenter represented the rule (at the beginning of the next session). She then worked on the task for a short period of time and walked away again. Thus, although she worked on one particular task on four separate days, she

did not complete it, even by the end of the condition.

Because this new assembly task differed from the pick-up task, the low rate of task completion might have been due to the nature of the task rather than the rule; or the low rate might have been due to some time-correlated variable, or a sequence effect. Therefore, to the 4 children (S2, S3, S5, S6) not completing any task during this condition, the experimenter stated rules specifying immediate deadlines and the immediate delivery of a reinforcer—the same contingency specified in the earlier condition that generated high compliance. Except for S3, the childrens' performance improved to 100% (see Table 1). This suggests that the childrens' failures to complete the assembly tasks were not due to the difficulty of the task nor to a confounding time-correlated variable. Instead they were due to the weaker control of rules describing no deadlines with delayed reinforcers.

Data from the two additional children who asked to join the study are presented for the final two conditions. Their performances generally paralleled those of the other children (see Table 1).

Several children immediately changed their behavior from noncompliance to compliance when the rule described a contingency with a deadline and an immediate reinforcer. In other words, they changed their behavior before the contingency had contacted their behavior. So this suggests rule-governed behavior and not contingency controlled (shaped) behavior.

The verbal behavior of the children also indicated the weaker control exerted by rules describing no deadlines and the delayed delivery of reinforcers. For example, when the experimenter presented such rules, some of the children procrastinated and said, "I'll do it next time" or "I'll do it when you have the Magic Box" (referring to the delay in the delivery of the reinforcer). Others would say, "What did you say?" or "No, I don't want to." One child (S4) emitted a line worthy of the best adult procrastinator when he said, "I'll do it when the snow melts" (it was the middle of

January, and we think no irony was intended).

Deadlines With Delayed Reinforcers

The question remained, what feature of the description of the contingency resulted in the low rate of task completion, when the rule described a contingency with no deadline and a delayed reinforcer? Was it the description of the absence of a deadline, the description of the delayed reinforcer, or a combination of the two? Because delayed reinforcement is fairly ineffective, many behavior analysts seem to assume that rules describing delayed reinforcers will not be effective. However, our theoretical analysis suggests that the delay of the reinforcer usually plays little, if any, role in the control exerted by rules. On the other hand, our theoretical analysis does suggest that the absence of specified deadlines will greatly decrease the control rules exert.

In fact, when the rule specified a delayed reinforcer with a deadline, the children completed 74% of the tasks. This suggests that the deadline specified by the rule was critical for rule control. Because of the end of the school year, we were not able to evaluate the control of the rules specifying an immediate reinforcer and no deadline. So, at this point, it is not clear whether the specification of an immediate reinforcer would cause the rule to effectively govern the childrens' behavior, in spite of the lack of a deadline.

THEORETICAL ANALYSIS

Rules describing reinforcers that are too delayed to reinforce the causal response (contingencies that are not direct-acting) can control the behavior of children as young as four years of age. We theorize that control was due to the rule statement functioning as an establishing operation (Malott, 1984, 1989; R.W. Malott & M. E. Malott, 1990) and, thus, creating a direct-acting contingency.

According to this theory, the statement of the rule established noncompliance with the rule as a learned aversive condition, so compliance with the rule immediately, and

perhaps automatically, terminated or reduced this aversive condition. For example, consider the rule, "If you do the puzzle now, one week after you finish you can go to the Magic Box." Following the statement of the rule, noncompliance might have generated a learned aversive condition (commonly called anxiety, guilt, fear, etc.), as well as aversive self-statements about not doing the puzzle and not getting a reinforcer. In this way, then, assembling the puzzle (rule compliance) would have been directly reinforced by an immediate reduction in the learned aversive condition established by the rule statement. This theoretical direct-acting escape contingency may account for the control by rules describing contingencies that are not direct-acting (one-week delayed reinforcers). Furthermore, even though the reinforcer was delayed, rules describing deadlines exerted more reliable control than those describing no deadlines. Using the above analysis of a rule as an establishing operation, we further theorize that the statement of a rule describing a deadline established noncompliance combined with the proximity to the deadline as the aversive condition. That is, the deadline rule described a limited hold for attaining the delayed reinforcers. If the children did not immediately comply with the rule they lost the opportunity to receive the delayed reinforcer. So through compliance, the children escaped the aversive condition created by the statement of the rule describing the deadline.

However, when the experimenter stated rules that did not describe a deadline an aversive condition would not have been established and there would have been no direct-acting escape contingency to reinforce compliance.

In summary, rules describing contingencies with deadlines reliably govern the behavior of middle-class four-year-old children, regardless of whether the rules describe the contingent delivery of immediate or delayed reinforcers. We assume there must be a direct-acting contingency of reinforcement to support this rule-governed behavior. Therefore, we infer that

the rule statement establishes noncompliance as a learned aversive condition and that escape from that aversive condition reinforces the compliance. The results suggest that the outcome (reinforcer or punisher) specified in a rule is critical for control at this age.

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